

DIVISION OF ENVIRONMENT
QUALITY MANAGEMENT PLAN

PART III:

STATE WATER PLAN PROGRAM
QUALITY ASSURANCE MANAGEMENT PLAN

Revision 1
January 10, 2002

Kansas Department of Health and Environment
Division of Environment
Bureau of Environmental Remediation
Curtis State Office Building
1000 SW Jackson, Suite 410
Topeka, Kansas 66612-1367

Concurrences and Approvals

Concurrences, KDHE Division of Environment, Bureau of Environmental Remediation

Name: Rick Bean
Title: Section Chief, Remedial Section

Signature_____ Date_____

Name: Bill Morris
Title: QA Representative, Bureau of Environmental Remediation

Signature_____ Date_____

Name: Gary Blackburn
Title: Director, Bureau of Environmental Remediation

Signature_____ Date_____

TABLE OF CONTENTS

<u>Section</u>	<u>Revision No.</u>	<u>Date</u>
1 INTRODUCTION		
1.1 Purpose of Plan	1	01/10/02
1.2 Plan Revisions	1	01/10/02
2 DESCRIPTION OF PROGRAM		
2.1 Historical Overview	1	01/10/02
2.2 Mission and Goals	1	01/10/02
2.3 Organization and Responsibilities	1	01/10/02
3 QUALITY ASSURANCE POLICY STATEMENT		
4 QUALITY ASSURANCE CRITERIA AND PROCEDURES		
4.1 Field Station Site Selection	1	01/10/02
4.2 Field Equipment Installation	1	01/10/02
4.3 Sampling Types	1	01/10/02
4.4 Safety Consideration	1	01/10/02
4.5 Requesting Analytical Services	1	01/10/02
4.6 Procedures for Assessing Data Precision, Accuracy, Representativeness and Comparability	1	01/10/02
4.6.1 Ongoing Quality Assurance Review and Special Audits	1	01/10/02
4.6.2 Instrument Calibration and Maintenance ..	1	01/10/02
4.6.3 Quality Control Blanks and Spikes	1	01/10/02
4.7 Corrective Action Procedures	1	01/10/02
4.8 Data Management	1	01/10/02
4.9 Quality Assurance/Control Reporting Procedures .	1	01/10/02
APPENDICES	1	01/10/02

Section 1

INTRODUCTION

1.1 Purpose of Plan

This document presents the quality assurance management plan for the State Water Plan program. The plan describes the mission, developmental history, organizational structure, environmental monitoring protocols, data handling procedures, and quality assurance (QA) and quality control (QC) requirements of these programs. Standard operating procedures (SOPs) and equipment used in the programs are presented in Appendix A.

1.2 Plan Revisions

To be effective and useable, this document must be maintained in an up-to-date condition. As required by the Division of Environment Quality Management Plan (Part I, section 7), the contents of the plan are reviewed on at least an annual basis. Minor changes in the report's organizational structure or terminology may be approved by the Section Chief. However, major revisions which substantially change the contents of the document, especially in terms of QA policies or procedures, require the added approval of the Section Chief, Bureau QA Representative and the Bureau Director.

Section 2

DESCRIPTION OF PLAN

2.1 Historical Overview

The Orphan Sites Unit is responsible for the implementation and development of the State Water Plan (SWP) Contamination/Remediation Program. The SWP Contamination/ Remediation Program was developed in response to legislation, specifically, the State Water Resources Planning Act (K.S.A. 82a-901 et seq.). The State Water Resources Planning Act (SWRPA) was drafted in 1986 and implemented to provide a mechanism to ensure the supply of water in the State of Kansas is of sufficient quantity and quality to meet the current and future needs of its citizens. The SWRPA consisted of numerous subsections which are generally programs delegated to State Agencies for implementation and operation. Funding for operation of the SWRPA programs is provided on an annual appropriations budget with overall funding generated by fees applied on municipal, industrial, and stock watering water use; fees on fertilizer and pesticide sales; and from the State General Fund. KDHE/BER developed its SWP program to implement the "Contamination Remediation" Subsection of the SWRPA.

2.2 Mission and Goals

The Contamination Remediation Subsection of the SWRPA is intended to address contaminated soil, surface water, and ground water that may potentially affect water supply quantity or quality within the state, noting the primary objective for the subsection was conceptually based on the following SWRPA policy recommendation:

"Require the State to initiate remedial procedures when a responsible party is unknown or cannot or will not undertake necessary actions. Any person determined responsible would still be responsible for repayment of the cost of the clean-up work."

KDHE/BER's SWP program was developed to provide the resources to achieve the recommended policy statement. Elements of the SWP program include: 1) potentially responsible party (PRP) searches; 2) site assessments; 3) comprehensive investigations; 4) long term monitoring; 5) corrective action studies; 6) corrective action plans; 7) corrective action implementation; 8) reclassification of sites; and 9) cost recovery for funds expended upon determination of a responsible party.

Sites addressed through BER's SWP program are generally referred to as "Orphan Sites". These are sites that generally fall outside the parameters of other programs which means there are no alternative state, federal, or other funding sources to provide for investigation and cleanup activities. As previously stated, sites that can be addressed through BER's SWP program are those where no responsible party has been identified, or if identified, the responsible party is financially unable to or not willing to undertake necessary activities to address the contamination.

The goals of KDHE/BER's SWP program are defined as follows:

- (1) ensure that the state's water supplies which have been contaminated are carefully evaluated for both human health risks and environmental impact in a timely manner;
- (2) develop procedures within the program to standardize a consistent approach to addressing contaminated sites and maximize efficiency of limited resources in addressing the sites;
- (3) develop, maintain, and implement a ranking system to allow sites with greatest potential impact to be addressed in order of priority;
- (4) based on ranking, undertake necessary monitoring, investigative, and remedial actions as appropriate to address contaminated sites;
- (5) provide a funding and resource mechanism for expedited response in addressing emergency sites (highest order ranking);
- (6) defer sites to appropriate programs upon determination of a viable responsible party;
- (7) reclassify sites when no further monitoring, investigative, or remedial actions are considered necessary.

2.3 Organization and Responsibilities

ORGANIZATIONAL CHART

(See Exhibit 1 in the BER QA Plan Part II)

The Bureau Director's responsibilities are defined in the BER QA management plan presented in Part II of the QMP.

The Section Chief is responsible for supervising the Unit Leader of the Orphan Sites Unit. The operations and implementation of uniform policies and procedures for the SWP Program is the responsibility of the Section Chief. The Section Chief and the Unit Leader, respectively, are responsible for planning, organizing, supervising and directing the statewide activities of the SWP program. Additionally, the Section Chief is responsible for coordination between the units within the Remedial Section.

The Unit Leader is the SWP program manager and is responsible to ensure that the requirements of the program-level QA management plans and SOPs are implemented in a consistent, timely and reliable manner. Working with the Section Chief, the Unit Leader strives to improve the precision, accuracy and reliability of all environmental monitoring data collected as part of the SWP program through the effective allocation of staff and resources.

Most of the actual investigative or remedial work conducted pursuant to the SWP program is conducted by private environmental consulting firms working under a time and materials type contract; the contract is developed between BER and the environmental consulting firms. The Unit Leader and the Environmental Geologist II Staff Person actively participate in the contract procurement process.

SWP program staff provide direction and oversight of all scientific investigations and remedial actions performed relative to the SWP program. Each individual SWP program project manager is responsible for many of the following functions:

- (1) reviews and evaluates hydrogeologic investigation work plans and reports for completeness, accuracy and technical adequacy;
- (2) provides technical direction to allow for correction of perceived deficiencies in work plans and reports;
- (3) administers project management for ground water, surface water and soil remediation sites where ongoing investigations and cleanups are occurring;
- (4) evaluates monitoring and general remedial data to ensure that the project is progressing at an acceptable time frame;
- (5) reviews or designs ground water quality sampling programs to assure that the proper evaluation of potential sites is performed;
- (6) collects split, duplicate, or collocated environmental samples to ensure the representativeness and general quality of the various samples collected at a site throughout the investigation;
- (7) prepares scopes of work and reviews and negotiates cost proposals for investigative or remedial work to be conducted to achieve objectives in a cost effective manner. Tracks costs and reviews invoices for work performed for accuracy;
- (8) conducts detailed review of site information for the purposes of ranking the health and environmental risk posed by contamination at a site; and
- (9) represents the Agency at public meetings and other forums to present information regarding program activities;

Section 3

QUALITY ASSURANCE / CONTROL POLICY STATEMENT

Project Managers do not possess a distinct set of standard operating procedures for administration of quality assurance/quality control for the SWP program. As previously stated, most of work conducted pursuant to the SWP program is performed by environmental consulting firms working under contract with the KDHE. Each of the environmental consultants working under contract has prepared a well-defined Quality Assurance Project Plan (QAPP) which includes the contractors', and all subcontractors', standard operating procedures for work to be performed, which may consist of SOPs included in Appendix A. These QAPPs and SOPs are reviewed for consistency with KDHE's SOPs during the contract procurement process and prior to formally contracting with the environmental consulting firm.

The project manager's role within the SWP program is generally broad, including development of scopes of work for site monitoring, investigations, remedial designs and remedial actions. The SWP project manager submits the scopes of work to a contractor then receives and reviews cost proposals and work plans submitted by the environmental contractor. As an element of the review process, the SWP project manager ensures that the environmental contractor had prepared a suitable site specific QAPP to ensure established data quality objectives will be achieved. Each project manager also ensures site specific QAPPs and SOPs are in compliance with KDHE's SOPs and SOPs provided in numerous federal regulatory guidance documents.

SWP project managers are often independently involved with the collection of soil and ground water samples at SWP sites. All sampling activities conducted by SWP project managers or designated technicians comply with the following program policies:

- (1) The objectives of any environmental monitoring project shall be determined prior to implementation of data collection activities. This determination shall be accomplished during the planning stage of the project so that appropriate procedures will be incorporated into the design of the project and the resulting data will have a reasonable probability of meeting the stated objectives.
- (2) Sample collection and analysis activities and data management activities shall be subjected to periodic evaluation by supervisory personnel to identify and correct deficiencies and enhance the overall credibility of the Section's environmental monitoring programs.
- (3) All data collection activities will be accomplished and documented in accordance with a Divisional QA plan and applicable Standard Operating Procedures (SOPs), included in Appendix A.

Federal guidance documents frequently referenced for quality assurance/ quality control by SWP program staff include, but are not limited to:

- * A Compendium of Superfund Field Operations Methods (EPA/540/P-87/001, December 1987);
- * Data Quality Objectives for Remedial Response Activities (EPA/540/G-87/003, March 1987);
- * Guidance for Data Usability in Risk Assessment (EPA/540/G-90/008, October 1990);
- * Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA/540/G-89/004, October 1988); and
- * Risk Assessment Guidance for Superfund (EPA/540/1-89/002, December 1989);
- * Standard Operating Safety Guidelines (EPA Publication 9285.1-03/PB92-963414, June 1992);
- * Standard Practices for the Description and Identification of Soils; (American Society for Testing and Material Standard D-2488, October 1990);
- * Standard Practices for the Design and Installation of Ground Water Monitoring Wells in Aquifers (American Society for Testing Materials Standard D-5092, October 1990);
- * Standard Practices for Soil Investigation and Sampling by Auger Boring (American Society for Testing and Materials Standard D-1452, October 1990).

Section 4

QUALITY ASSURANCE / CONTROL CRITERIA AND PROCEDURES

4.1 Field Station Site Selection

The selection of sampling locations is based on several factors including type and purpose of the sample, representativeness, accessibility (permission to sample), location of existing wells, location of potential source areas of contamination and location of potential target areas. Selection criteria vary depending upon the type of medium being sampled and the purpose of the sampling which are described in site-specific QAPP plans.

4.2 Field Equipment Installation

Generally field staff will use non-dedicated sampling equipment that is either disposable or reusable. Sampling equipment designated for reuse must be decontaminated as specified in SOP (BER-05). Some sites as designated by the project manager may have dedicated sampling equipment in place.

4.3 Sampling Types

SWP program staff primarily provide quality assurance/quality control management services through the oversight of work conducted by SWP environmental contractors, and possibly, collection of split, duplicate, replicate, and/or collocated environmental samples concurrent with environmental sampling performed by SWP environmental contractors. In addition, program staff may occasionally be required to independently collect environmental samples.

Ground water is the most frequent environmental media sampled, followed by surface and subsurface soils, surface water, sludge, sediment, and air. In addition, program staff may be required to collect special samples including influent and effluent water samples associated with ground water or surface water remedial systems, or remedial performance samples including potentially hazardous wastes or materials which have been stabilized to facilitate handling and transport or to reduce contaminant mobility.

SWP program staff collecting quality assurance/quality control environmental samples adhere to the sample collection procedures specified in the KDHE-approved site-specific Field Sampling Plan (FSP). QA/QC sample collection procedures proposed by SWP environmental contractors are reviewed for compliance with their standard QAPP and SOPs as well as KDHE's SOPs. KDHE's approval of the site-specific Field Sampling Plan is dependent upon the FSP's compliance with field methods and sampling procedures provided in the "Compendium of Superfund Field Operations Methods", which is a compilation of demonstrated field techniques that have been used during remedial response activities at hazardous waste sites (U.S. EPA, September 1987). The purpose of the FSP is to ensure that sampling data collection activities will be comparable to and compatible with data previously collected.

SWP program staff independently collecting environmental samples follow various internal standard operating procedures. Standardized operating procedures (SOPs) developed for program staff include: BER-01 for the collection of ground water samples; BER-03 for the collection of soil samples; BER-02 for the collection of surface water samples; BER-04 for the collection of sediment samples; and BER-11 for sample control, i.e. identification, transport and chain-of-custody.

4.4 Safety Considerations

Field and laboratory staff that participate in environmental monitoring programs encounter potentially dangerous situations on a frequent basis. In addition to the routine possibility of automobile or equipment accidents, employees may encounter extremely slippery surfaces, toxic or hazardous substances, infectious microorganisms, fire or electrocution hazards, vicious dogs, belligerent persons, or other threatening situations. Injuries or illnesses resulting from such situations may lead to substantial human suffering and, from a QA/QC perspective, deprive monitoring programs of the services of a valuable employee for an extended period of time.

Although it is not possible to predict every conceivable risk that may arise during the course of work, supervisors must ensure that those risks faced by staff on a recurring basis are addressed in the SOPs and are discussed during employee training. Field and laboratory staff are expected to abide by the safety protocols contained within the QA management plans and SOPs and to integrate safety considerations into all aspects of their work. Field staff should follow SOPs BER-18, BER-21 and BER-22. BER routinely budgets for ongoing safety training expenses and annual medical physicals for field staff associated with monitoring and/or field inspections of hazardous materials (refer to BER-17).

Non-supervisory employees are expected to bring potentially unsafe practices or situations to the attention of their program manager. In turn, the program manager shall evaluate the practice or situation and either take the appropriate corrective action or, in complicated circumstances, seek the advice of the appropriate Section Chief or higher level supervisor. Major corrective actions those warranting changes in an SOP shall be implemented by staff only upon approval of the Section Chief, Bureau QA Representative and Bureau Manager.

4.5 Requesting Analytical Services

SWP program staff independently collecting samples can employ several approaches for the submission of environmental samples to a laboratory for analyses. Staff can submit environmental samples directly to the Kansas Health and Environmental Laboratory (KHEL) or contract the services of an outside laboratory. Samples submitted for laboratory analysis by an SWP environmental contractor are submitted to a laboratory that has been previously approved by the SWP project manager during the work plan review and approval process.

The laboratory selected by the SWP project manager or the SWP environmental consultant must have a specific Quality Assurance and Quality Control Plan approved by the Division Director prior to utilization by the Section. Generally, the KHEL will be used for a majority of the program's analytical service. However, the purpose of the contractual arrangements is to provide additional analytical capacity; quality assurance and quality control (inter-laboratory duplicates); and to provide expanded analytical services.

4.6 Procedures for Assessing Data Precision, Accuracy, Representativeness and Comparability

4.6.1 Ongoing Quality Assurance Review and Special Audits

All QA/QC aspects of the State Water Plan Program are subject to ongoing review by the Unit Chief and Section Chief. Nonsupervisory staff are expected to cooperate fully with administrative requests for information on data precision/accuracy and overall QC performance. The Unit Chief is expected to track the QC performance of project managers, assist managers in identifying QC deficiencies within their assigned projects, and facilitate the initiation of necessary corrective actions (see section 4.7, below). The Section Chief is expected to track the overall QA/QC performance of the program, assist the Unit Chief in identifying QC deficiencies, and facilitate the initiation of necessary corrective actions. The Section Chief also is responsible for summarizing the overall QA/QC performance of the program in annual reports required under Part I, section 7, of the QMP.

To enhance the quality and credibility of the environmental data gathered by program staff, the State Water Plan Program may, at the discretion of the Section Chief, Bureau Director or Deputy Division Director, be required to participate in QA/QC audits performed by an independent party. Audit findings, and corrective actions implemented in response to such findings, are reported to the Bureau QA Representative, Bureau Director and Deputy Division Director in the annual program QA/QC reports.

4.6.2 Equipment Calibration and Maintenance

SWP environmental contractors are required by the SWP project manager to identify all field equipment to be used SWP related field activities. SWP project managers review all proposed equipment to ensure the equipment is appropriate for the intended task and desired data quality objectives. The SWP project manager also reviews proposed calibration procedures and frequencies of field equipment to determine compliance with the environmental contractor's approved SOPs. The environmental contractors are required to provide post documentation of calibration and results conducted during field activities. SWP environmental contractors are generally required to provide a statement that all equipment is maintained in accordance with manufacturer's direction (usually included with the SOPs provided in the contract procurement process).

For field work conducted independently by SWP program staff, all field equipment must be checked out from the Bureau's Equipment and Supply Technicians. The individual users of field equipment are responsible for the maintenance (in accordance with manufacturer's procedural manuals and/or standard operating procedures) of the equipment while being used in field operations. The user

should ensure the equipment is checked for proper operation and is current with calibration requirements (if needed) prior to leaving for field. The user should record any malfunctions encountered while in the field in the logbook associated with the equipment. The user should make sure the malfunctions are communicated to Unit Leader and Bureaus's Equipment and Supply Technicians upon return of the equipment to storage so that appropriate action can be initiated to repair the item of equipment, or initiate actions (e.g., prepare a Purchase Requests or Purchase Acquisitions) to get the equipment repaired upon return from the field.

4.6.3 Quality Control Blanks and Spikes

Quality control procedures must be taken by field staff to ensure the integrity of the samples collected. Without checks on the sampling and analytical procedures, the potential exists for contradictory or incorrect results. Procedures describing quality control samples are defined in BER-12 or are included in specific SOPs.

4.7 Corrective Action Procedures

In the context of quality assurance (QA), SWP program corrective actions are procedures that may be implemented on environmental samples that do not meet predetermined QA specifications. In general, the corrective action procedures program addresses the analysis of any cause precipitating a negative audit finding and identifies the appropriate corrective action(s) necessary to address it. SWP program staff, or the appropriate quality assurance/quality control program designee, are responsible for reviewing data validation reports, audit reports and nonconformance reports, to identify significant or repetitious conditions adverse to quality, or deficiencies regarding the implementation or adherence to required quality assurance practices. In addition, the program staff, or QA/QC designee, is required to investigate the source(s) of the problem and is responsible for defining and/or implementing the necessary actions to remedy the problem.

The quality characteristics of data generated by sampling, monitoring, or analyzing, is defined in the following terms:

Accuracy: The degree of agreement of a measurement, or an average of measurements of the same thing, X , with an accepted reference or true value, T , usually expressed as the difference between the two values, $X - T$, or the differences as a percentage of the reference or true value, $100(X - T)/T$, and sometimes expressed as a ratio, X/T . Accuracy is a measure of the bias inherent in the system.

Precision: A measure of mutual agreement among individual measurements of the same property, usually under prescribed similar conditions. Precision is best expressed in terms of the standard deviation. Various measures of precision exist depending on the prescribed similar conditions.

Completeness: A measure of the amount of the valid data obtained from a measurement system, compared with the amount that was expected to be obtained under correct normal conditions, and that was needed to be obtained in meeting the project data quality objectives.

Representativeness: The degree to which data accurately and precisely represent a characteristic of population, the parameter variations at a sampling point, a process condition, or an environmental condition. It also includes how well the sampling point represents the actual parameter variations that are under study.

Comparability: The confidence with which one data set can be compared with another; a qualitative characteristic that must be assured in terms of sampling, analysis, reporting, etc.

The exact values of the quality characteristics will vary depending upon the analytical processes and procedures employed. Site-specific work plans will detail the recommended field activities and analytical methodologies necessary to establish the appropriate data quality characteristics. Corrective actions may include re-sampling, re-analyzing samples, or auditing laboratory procedures.

4.8 Data Management

All work plans submitted in association with the SWP program require a data management system including field logs, sample management and tracking procedures, and document control and inventory procedures for both laboratory data and field measurements to ensure that the data collected during the investigation are of adequate quality and quantity to support the findings of the investigation, risk assessment (if performed), and corrective action study.

For each measurement, the data reduction scheme planned for collected data, including all equations used to calculate the concentration or value of the measured parameter, should be described. The principal criteria employed to validate the integrity of the data during collection and reporting should be referenced. All data collected should be validated at the appropriate field or laboratory quality control level to ascertain whether it is appropriate for its intended use. All task management and quality controls implemented shall be documented within the appropriate report appendix.

4.9 Quality Assurance/Control Reporting Procedures

All reports or deliverables submitted through the SWP program require a quality assurance/quality control status summary of the project and any conditions adverse to the quality. The report should contain an assessment of measurement data accuracy, precision and completeness, results of any performance audits, results of system audits, any reported non-conformance, and any quality assurance problems, together with recommended solutions or corrective actions.

In addition, end-of-year program QA evaluations are conducted by the Section Chief and the results submitted, in writing, to the Bureau Director and the Deputy Division Director by February 15 of the following year. The reports must indicate when, how, and by whom the evaluation was conducted, the specific aspects of the program subjected to review, a summary of important findings, and technical recommendations for necessary corrective actions. The Section Chief is expected to discuss the findings of these evaluations with the Unit Chiefs and all participating field, laboratory and data management staff.